

PAPERS READ.

PLANTS WHICH HAVE BECÔME NATURALIZED IN N. S. WALES.

BY W. WOOLLS, PH.D., F.L.S.

As, on several occasions, I have given partial lists of the plants which have become naturalized in N. S. Wales, I propose now to enumerate all such species as have been observed, and to arrange them systematically according to the plan pursued by Baron Mueller in his Census of the Australian Plants. There is a great difficulty in determining, in some instances, whether certain species are indigenous or introduced; and as years roll on and native plants disappear in the progress of cultivation, the difficulty will be increased. In the preface to the Census, the Baron observes:—"The lines of demarcation between truly indigenous and more recently immigrated plants can no longer in all cases be drawn with precision; but whereas *Alchemilla vulgaris* and *Veronica serpillifolia* were found along with several European-*Carices* in untrodden parts of the Australian Alps during the authors earliest explorations, *A. arvensis* and *V. peregrina* were at first only noticed near settlements. The occurrence of *Arabis glabra*, *Geum urbanum*, *Agrimonia Eupatoria*, *Eupatorium cannabinum*, *Carpesium cernuum* and some others may therefore readily be disputed as indigenous, and some questions concerning the nativity of various of our plants will probably remain for ever involved in doubts." Whilst it must be admitted, then, that there is some degree of uncertainty in dealing with species supposed to be of exotic origin, especially such plants as those to which the Baron refers, there are many which are known to have been introduced at particular times, and under particular circumstances, some having been introduced for industrial purposes, and others having sprung up amidst crops raised from foreign seed; whilst the great majority of those to which the name of weeds is given, have been

conveyed to us over the ocean by birds, by currents of air, or by the wool, manes, tails, &c., of imported quadrupeds. As the great majority of these plants, now common to Australia and other regions, were not known to the first colonists, and do not appear in the lists of plants published by the early Botanists, it is only reasonable to suppose that such species were not found in N. S. Wales at the beginning of the Century. Brown's *Prodomus*, which gives an account of the Plants collected by him between the years 1802 and 1805, is a most useful guide, so far as it goes, in determining what species are really indigenous; but even in that most valuable work we are somewhat staggered in finding *Solanum nigrum*, *Verbena officinalis*, *Prunella vulgaris*, and *Cynodon dactylon* recorded amongst Australian plants. Judging *a priori*, it might be thought that the first three of these came from Europe and the last from India, but such does not appear to have been the case. Some years ago, when *Cyperus rotundus* (then called *C. hydra*) made its appearance in the Government Gardens in Parramatta, Caley the Botanist regarded it as a foreign importation, and so it was looked upon until the publication of the Seventh Vol. of our Flora, when Mr. Bentham proved from specimens forwarded to him from Australia, that it was a plant of very wide distribution, and identical with Brown's *C. littoralis*. Some years after Caley had left the colony, he wrote to Mr. G. Suttor, F.L.S., from the Island of St. Vincent, where he held the office of Director of the Botanical Garden, referring to the *Cyperus* which he had noticed in Parramatta and identifying it with the weed which was doing so much mischief to gardens and plantations in the West Indies. Now, this circumstance shows us how difficult it is to determine, in some instances, whether certain plants are indigenous or not. The same remark is applicable to *Cynodon dactylon*, the "couch grass" of the colonists, for, whilst Brown collected it at Port Jackson in the beginning of the present century, it is known to be identical with the Doorba (sometimes written Doorwa) or Hurryalee grass of India and to spring up generally in ground that has been cultivated. On the flats near some of our rivers, there is a grass called "Water Couch"

(*Paspalum distichum*), which the old hands say was unknown in the early days of the colony, and yet this grass is the same as Brown's *P. littorale*, which may still be found growing on the shores of Port Jackson, as well as in the Tropical Regions of the New and Old World. *Sorghum Halapense* (*Andropogon Halapensis*) is another grass which presents some difficulty, for whilst Baron Mueller places it amongst the indigenous species of Western Australia, N. S. Wales and Queensland, the settlers on the banks of the Hawkesbury look upon it as a recent importation, and seed of it has been circulated under the name of *Panicum spectabile* ! There is good reason, therefore, for saying that "the lines of demarcation between truly indigenous and more recently immigrated plants can no longer in all cases be drawn with precision." It seems almost impossible to decide, indeed, in the case of certain Caryophyllaceous and Cruciferous plants ; for, whilst they are now widely disseminated throughout the colonies, there is no record of them as indigenous in the early days of the colony. Sir J. D. Hooker, writing in 1859, places *Polycarpon tetraphyllum* and *Sagina apetala* amongst introduced plants, but Baron Mueller, in his recent Census (1883), regards them as common to several parts of Australia. Again Hooker has *Portulaca oleracea* in his list of importations, but the Baron, having ascertained that the plant occurs in five Australian colonies, as well as in the arid regions of the north, is forced to the conviction that it is really indigenous.

It is worthy of remark, that whilst many English plants have become naturalized in Australia, no Australian plant has become naturalized in England. Hooker observes :—"For my own part, I am disposed to consider that the three elements of (1) abundant exportation of seed from Europe into Australia for agricultural and horticultural purposes, and scanty export of Australian seed produce to England ; (2) better adaptation of Australia than England to support numerous forms of vegetable life ; and (3), abundance of unoccupied ground in Australia as compared with England, are, combined, all but sufficient to account for the predominance of so many European naturalized plants in Australia,

and for the converse state of things in England." The climate and soil differ so much from each other in England and Australia, that one would scarcely expect many species to be common to both, or that the plants of the one should spring up accidentally amongst those of the other; and yet it appears, that, whilst Australian plants are cultivated with difficulty in England, English plants find their way hither and flourish; thus showing, that, owing to the absence of long frosty winters and to the rare occurrence of cold drizzling rains, Australia is better adapted to support numerous forms of vegetable life than England.

In reviewing the list of naturalized plants, it will be found that not more than one-sixth of the whole are monocotyledonous, whilst of the dicotyledonous plants no less than 35 belong to the order of the Compositæ. With regard to the scantiness of the former, it may be observed, that as we descend in the vegetable kingdom, the species are more Cosmopolitan in their character, or have a wider distribution than plants of a higher organisation. Hence grasses, rushes, and sedges, have many species in common in sub-tropical and temperate countries. Balfour says that "Humboldt and Bonpland, in their travels in equinoctial America, did not see an exogenous plant which was found equally in the New and the Old World; the only plants which they discovered common to both being some grasses and sedges." As we proceed from the tropics, the greater number of cosmopolitan species are likewise endogens, whilst the introduced species of exogens vary in proportion to the extent of cultivation, the character of the soil, and the nature of their seeds. The Composite order of plants being the most extensive of all orders, and the species being found, though in different proportions, in all parts of the world, it might naturally be expected that many of them would find their way to this colony amidst the various seeds imported for the purposes of cultivation. Such has been the case in some instances, but the most troublesome weeds of the order appear to have been introduced accidentally. The seeds of many Composites are well adapted for a wide distribution, for whilst the pappus of some species serves as an apparatus for conveying them

through the air, the hooked or rough fruits of others cause them to be taken from place to place by animals. Amongst the Composites, which of late years have become a pest to graziers, the two species of *Hypochaeris* are the most remarkable. These plants establish themselves in the bush, as well as in cultivated ground, and render the pasture unpalatable for stock, though I have been informed, that in Victoria they are eaten by sheep. Now the pappus of these species is well adapted for scattering the seeds in all directions, as it is feathery and becomes the sport of every wind. The same remark is applicable to plants of the thistle kind, and this accounts for the great increase of such plants in all parts of the colony where they are permitted to go to seed. *Xanthium spinosum* affords an instance of distribution in another way. This plant (the Bathurst Burr of the colonists) has not any pappus, but the fruit or burrs are covered with hooked prickles which adhere to the manes and tails of horses, and the wool of sheep, and thus the seeds are conveyed from country to country. It is said that it was brought in the first instance to this colony in the manes of some South American horses, but it may also have found its way from the Cape of Good Hope in the wool of some imported sheep, for Dr. Shaw (Journal Lin. Soc., Vol. 14, 1874) traces its introduction into South Africa, and its enormously rapid distribution there, to that source. These instances, amongst many which might be given, are sufficient to account for the number of introduced Composites and their increase in the colony.

The consideration of this subject, in connection with the progress of cultivation, is interesting as showing the changes which are coming over the vegetation of N. S. Wales. It would appear from the Vegetable Fossils found in our auriferous drifts that the Flora of this colony and Victoria was very different in ages past from what it is now, and that, in the pliocene period, forests of trees which now exist only in fossilised fruits and wood, extended to what forms at the present period the valley of the Upper Macquarie. What relation the Flora of the past bears to the Flora of the present, remains yet to be investigated; but it seems to be pretty well established that the genus "*Spondylostrobis*

differs from all other cupressineous genera, living as well as bygone." (*F. von Mueller* in Geological Survey of Victoria). The late eminent Geologist, the Rev. W. B. Clarke, alludes to the Flora of the past in his work on "The Sedimentary Formations of N. S. Wales," p. 89, and Mr. Wilkinson the indefatigable Government Geologist and President of the Linnean Society of N. S. Wales, follows up the subject in his late Annual Address, informing us, that the fossil leaves of the Miocene or Eocene period belong to 27 species and 21 genera, of which only six of the genera are contained in the living Flora of Australia. Reasoning from these facts, Mr. R. Etheridge, Junr., of the British Museum, concludes, "That the Tertiary Flora of Australia is far more nearly allied to the Tertiary Floras of other Continents than to the living Flora of Australia." Great changes, then, have taken place in the Flora of N. S. Wales in long ages past, and it is equally certain that great changes (though probably from very different causes) are taking place now. On this side of the Dividing Range, the destruction of Eucalypts, the cultivation of the ground with foreign plants, and the naturalisation of 170 species from different parts of the world, have made great inroads on the indigenous Flora, and it is not too visionary to predict, that, in the course of another Century, many of the native plants will exist only in enclosed or remote places; whilst a mixed Flora, adapted to the altered circumstances of the colony, will usurp the place of the past vegetation. Where Sydney and Parramatta now stand, R. Brown collected many of his specimens, and as it was customary in the early days of the colony, to clear and burn off without reference to the value of the timber, the Eucalypts of which he speaks as so difficult to classify, have long since passed away from the immediate neighbourhood of these towns. In more recent times, the indiscriminate ring-barking of such trees has extended through the length and breadth of the colony, and, whilst the folly of this policy cannot be too strongly condemned as having some effect on the rainfall and health of the country, it is certain that it is making a great revolution in the Flora. The Rev. J. E. Tenison-Woods, in his very interesting account of Java, tells us that the

natives never destroy a teak-tree without planting another in its place, and he expresses a wish that the colonists in Australia would be as careful in respect to one of our ironbarks (*E. crebra*), which he regards as of equal value. It is rather strange that not long since, I remonstrated with a gentleman for allowing his overseer to ring-bark some of these very trees, for although *E. crebra* is not the most valuable of the iron-barks, yet it is one of our most durable timbers. But the changes to which I have alluded are not confined to this side of the Dividing Range. Many of the weeds enumerated in the subjoined list are now found at every sheep and cattle station in the interior, whilst it is to be feared that some of the best salt-bushes, as well as the graceful myall, are doomed to extermination. When sheep feed continually in the same paddocks, they eat down the salt-bushes and prevent the growth of young plants, so that some stations, which formerly had abundance of these plants, are now completely denuded of them. The Myall also suffers from the cattle, for as the old trees die off, the young ones are eaten or trodden down. In many parts, useful grasses and another plants are springing up in the place of those which are disappearing, but I mention the fact, merely in illustration of the changes which are taking place in our Flora. There was a time, when some of the orders now so largely represented on this continent did not exist here, and when the Flora of Australia was assimilated to that of Europe. And a day will come most assuredly, when in the necessary process of cultivation and the introduction of foreign species, many plants of what are now deemed Australian types will make way for a new order of things.

## LIST OF PLANTS NATURALIZED IN N. S. W.

### DICOTYLEDONEÆ.

#### RANUNCULACEÆ.

##### RANUNCULUS.

1. *R. muricatus*. (L.)



PAPAVERACÆ.

ARGEMONE.

2. *A. Mexicana.* (L.)

FUMARIA.

3. *F. officinalis.* (L.)

CRUCIFERÆ.

LEPIDIUM.

4. *L. sativum.* (L.)

5. *L. ruderale.* (L.)

RAPHANUS.

6. *R. raphanistrum.* (L.)

SINAPIS.

7. *S. arvensis.* (L.)

BRASSICA.

8. *B. campestris.* (L.)

SISYMBRIUM.

9. *S. officinale.* (Scop.)

SENEBIERA.

10. *S. didyma.* (Pers.)

CAPSELLA.

11. *C. bursa-pastoris.* (Mærch.)

CAMELINA.

12. *C. dentata.* (Pers.)

LINEÆ.

LINUM.

13. *L. Gallicum.* (L.)



GERANIACEÆ.

PELARGONIUM.

14. *P. graveolens*. (Ait.)

- ERODIUM.

15. *E. moschatum*. (Willd.)

OXALIS.

16. *O. cernua*. (Thunb.)

MALVACEÆ.

MALVA.

17. *M. rotundifolia*. (L.)

18. *M. parviflora*. (L.)

19. *M. sylvestris*. (L.)

CRISTARIA.

20. *C. coccinea*. (Pursh.)

SIDA.

21. *S. rhombifolia*. (L.)

EUPHORBIACEÆ.

EUPHORBIA.

22. *E. peplus*. (Willd.)

23. *E. helioscopia*. (Willd.)

RICINUS.

24. *R. communis*. (Willd.)

URTICACEÆ.

URTICA.

25. *U. dioica*. (L.)

26. *U. urens*. (L.)

CANNABINACEÆ.

CANNABIS.

27. *C. sativa*. (Willd.

CARYOPHYLLÆ.

GYPSOPHILA.

28. *G. tubulosa*. (Boiss.)

SILENE.

29. *S. Gallica*. (L.)

CERASTIUM.

30. *C. vulgatum*. (L.)

STELLARIA.

31. *S. media*. (L.)

SPERGULA.

32. *S. arvensis*. (L.)

DIANTHUS.

33. *D. prolifer*. (L.)

POLYCARPON.

34. *P. tetraphyllum*. (L.) (?)

PORTULACA.

35. *P. oleracea*. (L.) (?)

AMARANTACEÆ.

AMARANTUS.

36. *A. paniculatus*. (L.)

37. *A. blitum*. (L.)

38. *A. viridis*. (L.)

RUMEX.

- 39. *R. crispus*. (L.)
- 40. *R. conglomeratus*. (L.)
- 41. *R. acetosella*. (L.)

SALSOLACEÆ.

CHENOPODIUM,

- 42. *C. murale*. (L.)
- 43. *C. ambrosioides*. (L.)

ATRIPLEX.

- 44. *A. patula*. (L.)

FICOIDEÆ.

OPUNTIA.

- 45. *O. Tuna*. (Mill)
- 46. *O. ficus indica*. (Haw.)
- 47. *O. vulgaris*. (Mill.)

POLYGONACEÆ.

POLYGONUM.

- 48. *P. aviculare*. (L.)
- 49. *P. orientale*. (L.)

PHYTOLACCEÆ.

PHYTOLACCA.

- 50. *P. octandra*. (L.)

LEGUMINOSÆ.

ARGYROLOBIUM.

- 51. *A. Andrewsianum*. (Steud.)

MEDICAGO.

- 52. *M. sativa*. (L.)
- 53. *M. lupulina*. (L.)
- 54. *M. maculata*. (L.)
- 55. *M. denticulata*. (L.)

TRIFOLIUM.

56. *T. pratense*. (L.)

57. *T. repens*. (L.)

VICIA.

58. *V. sativa*. (L.)

59. *V. hirsuta*. (L.)

LOTUS.

60. *L. tetragonobolus*. (L.)

ULEX.

61. *U. Europæus*. (Willd.)

CAJANUS.

62. *C. bicolor*. (D.C.)

MELILOTUS.

63. *M. parviflora*. (Desf.)

ROBINIA.

64. *R. pseudacacia*. (Willd.)

ROSACEÆ.

ROSA.

65. *R. rubiginosa*. (L.)

ONAGREÆ.

ŒNOTHERA.

66. *O. biennis*. (L.)

67. *O. tetraptera*. (Willd.)

EPILOBIUM.

68. *E. roseum*. (Sm.)

UMBELLIFERÆ.

AMMI.

69. *A. majus*. (L.)

SIMUM.

70. *S. latifolium*. (L.)  
71. *S. angustifolium*. (L.)

PASTINACIA.

72. *P. sativa*. (L.)

ANETHUM.

73. *A. feniculum*. (Willd.)

BUPLEURUM.

74. *B. rotundifolium*. (Willd.)

DIPSACACEÆ.

SCABIOSA.

75. *S. atropurpurea*. (Willd.)

PASSIFLOREÆ.

PASSIFLORA.

76. *P. cœrulea*. (Willd.)

COMPOSITÆ.

CENTAUREA.

77. *C. Melitensis*. (L.)  
78. *C. calcitrapa*. (L.)

CARTHAMNUS.

79. *C. tinctorius*. (L.)

ONOPORDON.

80. *O. acanthium*. (L.)

CIRS-IUM.

81. *C. lanceolatum*. (Scop.)

CARDUUS.

82. *C. Marianus*. (L.)

EUPATORIUM.

83. *E. cannabinum*. (L.)

ERIGERON.

84. *E. Canadensis*. (L.)

85. *E. linifolius*. (L.)

ASTER.

86. *A. dumosus*. (Willd.)

XANTHIUM.

87. *X. spinosum*. (L.)

TOLPIS.

88. *T. barbata*. (Willd.)

SIEGESBECKIA.

89. *S. orientalis*. (L.)

GALINSOGEA.

90. *G. parviflora*. (Cav.)

BIDENS.

91. *B. pilosa*. (L.)

TAGETES.

92. *T. glandulifera*. (Schranck.)

ANTHEMIS.

93. *A. cotula*. (L.)

CHRYSANTHEMUM.

94. *C. segetum*. (L.)  
 95. *C. Parthenium*. (Pers.)

SOLIVA.

96. *S. anthemifolia*. (R. Br.)

GNAPHALIUM.

97. *G. luteo-album*. (L.)  
 98. *G. purpureum*. (Thunb.)

SENECIO.

99. *S. scandens*. (D.C.)  
 100. *vulgaris*. (L.)

CRYPTOSTEMMA.

101. *C. calendulaceum*. (R. Br.)

HYPOCHÆRIS.

102. *H. glabra*. (L.)  
 103. *H. radiata*. (L.)

PICRIS.

104. *P. hieracioides*. (L.)

CREPIS.

105. *C. Japonica*. (Benth.)

WEDELIA.

106. *W. hispida*. (Kunth.)

SONCHUS.

107. *S. oleraceus*. (L.)

CICHORIUS.

108. *C. intybus*. (L.)



LEONTODON.

109. *L. hirtus*. (L.)

TRAGOPOGON.

110. *T. porrifolius*. (L.)

TARAXACUM.

111. *T. dens-leonis*. (Desf.)

RUBIACEÆ.

GALIUM.

112. *G. aparine*. (L.)

SHERARDIA.

113. *S. arvensis*. (Willd.)

CAMPANULACEÆ.

LOBELIA.

114. *L. erinus*. (L.)

PLANTAGINEÆ.

PLANTAGO.

115. *P. lanceolata*. (Willd.)

116. *P. major*. (Willd.)

PRIMULACEÆ.

ANAGALLIS.

117. *A. arvensis*. (L.)

JASMINEÆ.

OLÆA.

118. *O. Europæa*. (Willd.)

ASCLEPIADACEÆ.

GOMPHOCARPUS.

119. *G. fruticosus*. (R. Br.)

APOCYNÆÆ.

VINCA.

120. *V. rosea*. (L.)

CONVOLVULACEÆ.

IPOMÆA.

121. *I. purpurea*. (Rot.)

CUSCUTA.

122. *C. epithymum*. (Willd.)

SOLANACEÆ

SOLANUM.

123. *S. pseudocapsicum*. (L.)  
124. *S. auriculatum*. (Ait.)  
125. *S. Sodomæum*. (L.)

VERBASCUM.

126. *V. blattaria*. (L.)

CELSIA.

127. *C. Cretica*. (L.)

NICANDRA.

128. *N. physaloides*. (Gærtn.)

LYCIUM.

129. *L. Chinense*. (Mill.)

DATURA.

130. *D. Tatula*. (L.)

NICOTIANA.

131. *N. glauca*. (Grah.)

SCROPHULARINEÆ.

LINARIA.

132. *L. elatine*. (L.)

ASPERIFOLLÆ.

ECHIUM.

133. *E. violaceum*. (L.)

LABIATÆ.

MARRUBIUM.

134. *M. vulgare*. (L.)

STACHYS.

135. *S. arvensis*. (L.)

LEONITES.

136. *L. leonurus*. (R.Br.)

SALVIA.

137. *S. verbenacea*. (L.)

MOLUCELLA.

138. *M. levis*. (L.)

VERBENACEÆ.

LANTANA.

139. *L. camara*. (L.)

VERBENA.

140. *V. Bonariensis*. (L.)

141. *V. venosa*. (G. & H.)

MONOCOTYLEDONEÆ.

IRIDEÆ.

SISYRINCHIUM.

142. *S. Bermudianum*. (L.)

143. *S. micranthum*. (Cav.)

TRICHONEMA.

144. *T. bulbicodium*. (H.K.)

SPARAXIS.

145. *S. tricolor*. (H.K.)

GLADIOLUS.

146. *G. cuspidatus*. (H.K.)

LILIACEÆ.

ZEPHYRANTHES.

147. *Z. Atamasco*. (Herb.)

ALLIUM.

148. *A. fragrans*. (Vent.)

COMMELINEÆ.

COMMELINA.

149. *C. Africana*. (Willd.)

GRAMINACEÆ.

STENOTAPHRUM.

150. *S. americanum*. (Schrank.)

APLUDE.

151. *A. mutica*. (L.)

PHALARIS.

152. *P. canariensis*. (L.)

ANTHOXANTHUM.

153. *A. odoratum*. (L.)

HOLCUS.

154. *H. lanatus*. (L.)

AVENA.

155. *A. fatua*. (L.)

DACTYLIS.

156. *D. glomerata*. (L.)

POA.

157. *P. annua*. (L.)  
158. *P. glauca*. (Sm.)  
159. *P. pratensis*. (L.)

BRIZA.

160. *B. maxima*. (L.)  
161. *B. minor*. (L.)

BROMUS.

162. *B. sterilis*. (L.)  
163. *B. mollis*. (L.)

CERATOCHLOA.

164. *C. unilioides*. (L.)

## LOLIUM.

165. *L. temulentum*. (L.)  
166. *L. perenne*. (L.)

## HORDEUM.

167. *H. nodosum*. (L.)  
168. *H. murinum*. (L.)
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NOTE.—*Psoralea pinnata* and *Reseda luteola* are by some regarded as naturalized plants, and Sir J. D. Hooker, places the Peach-tree (*Amygdalus persica*) in the same category. The following species, which also appear in his list, I have omitted, as I have never found them growing in a wild state:—

*Papaver album*.  
*Papaver dubium*.  
*Eschscholtzia californica*.  
*Lathyrus odoratus*.  
*Lathyrus latifolius*.  
*Lupinus polyphyllus*.  
*Delphinium consolida*.